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(54) Dirt collecting floor mat apparatus.

(57) A floor mat apparatus comprises a length (6) of plastics having a high plasticiser content, and therefore having a tacky surface to collect dirt and bacteria, trained about rollers (3,4) one of which is driven by a motor (4a) to bring fresh portions of the mat (6) to the upper stretch between rollers (3,4) across which people walk to a clean-room area. Portions of the mat leaving the upper stretch are washed at (7,8) and dried at (9) before returning to the upper stretch.

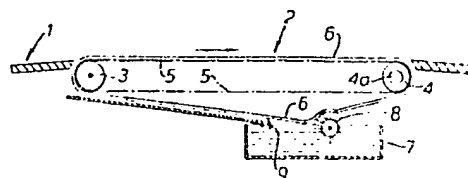


FIG. 1.

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DIRT COLLECTING FLOOR MAT APPARATUS

This invention relates to a floor mat apparatus for installing at the entrance to an area which is required to be kept free of dirt or bacteria, the floor mat apparatus serving to collect dirt or bacteria from the footwear of people walking through the entrance or from the wheels of trolleys passing through the entrance.

It is known from British patent specification 1 475 366 to form a floor mat from PVC having a high content of plasticizer so that the surface of the mat is tacky and the dirt or bacteria on peoples' shoes or on trolley wheels will adhere to the surface of the mat. Such mats are laid on the floor at the entrance to the area which is to be kept free of dirt or bacteria, for example in a hospital, or in a semiconductor or pharmaceutical plant. It is necessary to clean the mats reasonably frequently in order to maintain the dirt and bacteria absorbing properties. This cleaning is carried out using water to which a detergent has been added. Unfortunately, if the mats are cleaned when in position at the entrance where they are placed for use, the cleaning water washes under the mats and consequently the mats become very slippery and therefore dangerous. It is virtually impossible to clean the mats on the floor without incurring this problem, unless perhaps extreme precautions are taken, which precautions are time consuming

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and involve restricting the normal passage of people and increasing the number of cleaning personnel required. Alternatively, the mats may be removed to some other area for cleaning and drying. However, the mats are
5 very heavy and therefore difficult to handle easily and this procedure necessitates several sets of the costly mats, one set laid down in use, a second set cleaned ready to replace the one set, and a third set being cleaned and dried.

10 The present invention provides a floor mat apparatus comprising a length of mat material having a tacky surface for collecting dirt and/or bacteria, means for supporting the mat over an area across which personnel pass, means for moving the mat across said area so
15 that a fresh portion of the mat is moved into said area and a used portion of the mat is moved out of said area, and means for cleaning the used portion after being moved out of said area.

Embodiments of this invention will now be described, by way of examples only, with reference to the accompanying drawings, in which:

FIGURE 1 is a diagrammatic longitudinal section through a floor mat apparatus;

FIGURE 2 is a similar section, through a second
25 apparatus; and

FIGURE 3 is a similar section through a third apparatus.

Referring to Figure 1, a gap is provided in the floor at the entrance to an area or room 1 which is to be
30 kept free of dirt or bacteria. The floor area represented by this gap is provided by the floor mat apparatus 2. The gap may be formed by a recess in the floor, in which the apparatus is installed, or the apparatus may be placed on an existing floor with ramps at each end leading from
35 the existing floor level up to the top of the apparatus.

This apparatus comprises a pair of parallel, spaced rollers 3,4 about which is trained an endless steel or chain belt 5. The roller 4, remote from the "clean" area 1, is arranged to be driven by an electric motor 4a in such direction that the belt 5 moves in the direction away from the clean area 1 over its upper stretch. The mat with tacky surface is shown in the form of an endless belt 6, longer than the belt 5, and may comprise a single mat or several mats joined together. It is suspended as shown and held by the upper stretch of the belt 5.

A cleaning bath 7, containing water with a detergent added, is positioned below and a rotating brush 8 is provided, dipping at its lower side in the water and brushing the mat at its upper side. A rubber squeegee 9 is provided to press against the mat and wipe off excess water to speed the drying. The mat hangs freely under its own weight against both the brush 8 and the squeegee 9. Instead of or in addition to the squeegee 9, an air blower 9a may be provided (Figure 3) having a nozzle 9b directed at an angle to the belt 6 against the direction of movement of belt 6.

In use, the roller 4 is driven by its electric motor to move the belt 5 and hence the belt 6, so that the tacky mat moves in the direction of the arrow. This movement may be continuous or intermittent: for example, a light beam interrupted by a person walking over the mat may be used to drive the electric motor for some duration, either immediately or after a delay sufficient to allow the person to walk from the mat. The portion of mat leaving the area of the gap in the fixed floor passes towards the cleaning bath, where the brush 8 cleans the mat and the squeegee removes excess water. By the time this cleaning portion of the mat passes around roller 3 to come into use again, it is dried.

The rate of moving the mat across the effective

floor area may be made adjustable to the actual traffic density or dust input at the particular entrance where it is installed. The cleaning of the mat is not limited to the use of the brush 8 which is shown: for example, 5 the mat may pass directly under the surface of the water in the bath 7. The rubber squeegee may be arranged to be turned manually from time-to-time to touch the brush 8 to clean the squeegee.

The belt 6 may be made up of several pieces of 10 mat, each for example 2 metres long. The effective area between the rollers 3,4 (which is substantially level at its opposite end with the fixed floor either side of the apparatus) is typically 1 to 3 metres, but may be more depending upon such factors as traffic density, and dust 15 input.

Preferably the tacky mat includes a mechanical reinforcing, for example of fabric or steel mesh. This may be embedded in the mat or applied to the reverse side of the mat.

20 The cleaning bath may include means for filling it automatically to a predetermined level. Also, it may include filtering means for removing solids, for example, which are cleaned from the mat.

Figure 2 shows a modified arrangement which 25 enables a reduction in the height of the apparatus. Thus, the belts 5 and 6 are of the same length but are trained inwardly over the brush 8 and then over an intermediate roller 10.

Figure 3 shows an apparatus for refreshing the 30 mat with plasticiser. Thus a bath 11 of plasticizer solution is provided. Normally as shown, the belt 6 is washed by the brush 8 in bath 7, dried by blower 9a and returns in due course to the upper section for use. However, at night for example, when no traffic is passing, 35 a control means is energised to run the belt 6 for a time

period with the washing brush operating, to thoroughly wash the tacky belt. Then rollers 12 are lifted mechanically by the control means so that the belt 6 is no longer in contact with the washing brush 8 but the belt drive is continued for a time period to effect thorough drying. Then rollers 13 are mechanically lowered by the control means so that the belt passes through the plasticiser solution to regenerate the tacky material. Finally, rollers 13 are lifted and the belt is driven for a time period to dry the belt 6. The apparatus is thus fully reconditioned ready for use in the morning.

It will be noted that these apparatus provide automatic cleaning of the mat, avoiding the problems of slippery mats and minimising the requirement for cleaning personnel.

CLAIMS:

1. A floor mat apparatus comprising a length of mat material having a tacky surface for collecting dirt and/or bacteria, means for supporting the mat over an area across which personnel pass, means for moving the mat across said area so that a fresh portion of the mat is moved into said area and a used portion of the mat is moved out of said area, and means for cleaning the used portion after being moved out of said area.
2. An apparatus as claimed in claim 1, in which said supporting means comprises two of rollers around which the length of mat material is trained to pass endlessly and said means for moving the mat comprises drive means for driving one of said rollers.
3. An apparatus as claimed in claim 2, in which said supporting means comprises an endless reinforcing belt trained about said rollers and carrying said length of mat material.
4. An apparatus as claimed in claim 3, in which said endless reinforcing belt carries a belt of the mat material.
5. An apparatus as claimed in claim 4, in which the belt of mat material is longer than the reinforcing belt so as to hang downwards below the reinforcing belt over the lower stretch between the two rollers.

6. An apparatus as claimed in claim 4 or 5, in which said belt of mat material comprises a single endless said length of mat material.
7. An apparatus as claimed in claim 4 or 5, in which said belt of mat material comprises a plurality of lengths of said mat material joined together end-to-end.
8. An apparatus as claimed in any preceding claim, in which said cleaning means comprises a bath for containing water with added detergent and brush means for contacting the water and mat material successively.
9. An apparatus as claimed in any preceding claim, comprising drying means positioned downstream of the cleaning means.
10. An apparatus as claimed in any preceding claim, in which the means for moving the length of mat material operates to move the length of mat material continuously.
11. An apparatus as claimed in any one of claims 1 to 9, further comprising control means effective upon said means for moving the length of mat material to move the length of mat material intermittently.
12. An apparatus as claimed in claim 11, in which said control means includes a detector for detecting a person walking over the mat and for moving the length of mat material in response thereto.
13. An apparatus as claimed in any preceding claim, in which the mat material comprises a plastics with a high content of plasticiser, further comprising means for refreshing the mat material with plasticiser.

14. An apparatus as claimed in claim 13, further comprising control means for enabling said refreshing of the mat material at a selected time.

15. An apparatus as claimed in claim 14, in which said control means is effective, upon initiation, firstly to drive the mat moving means continuously for a first interval to effect thorough cleaning and secondly to disable the cleaning means and enable the refreshing means and drive the mat moving means continuously for a second interval to effect said refreshing.

16. A floor mat apparatus substantially as herein described with reference to Figure 1, 2 or 3 of the accompanying drawings.

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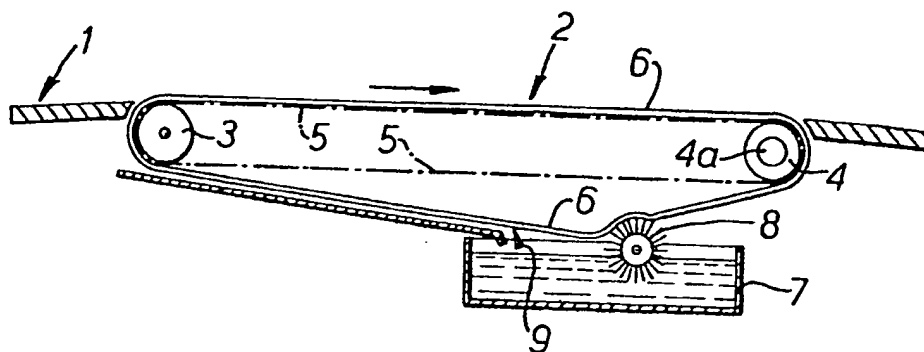


FIG. 1.

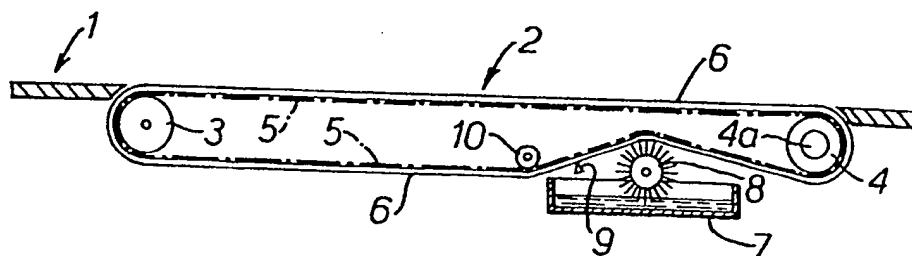


FIG. 2.

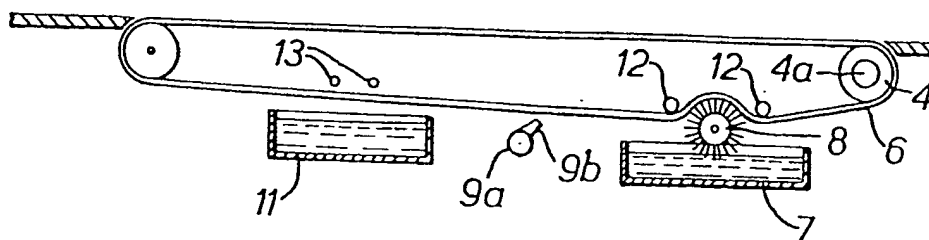


FIG. 3.



European Patent
Office

EUROPEAN SEARCH REPORT

0009891

Application number

EP 79 301 817.7

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<p><u>DE - U - 7 030 941</u> (H.E. KLIEMCHEN)</p> <p>* claim 1 *</p> <p>--</p> <p><u>DE - A - 1 924 506</u> (J.J. NAPPI)</p> <p>* complete document *</p> <p>--</p> <p><u>DE - A - 2 244 050</u> (LÜBBEN et al.)</p> <p>* complete document *</p> <p>--</p> <p><u>CH - A - 400 480</u> (A. MERKEL)</p> <p>* complete document *</p> <p>--</p> <p><u>US - A - 2 448 931</u> (C.O. SWANSON)</p> <p>* complete document *</p> <p>--</p>	<p>1,11, 12</p> <p>1,5,6, 8,9</p> <p>1,8</p> <p>1,8,11, 12</p> <p>1,8</p>	<p>A 47 L 23/22</p>
D	<p><u>GB - A - 1 475 366</u> (DYCEM PLASTICS LTD.)</p> <p>* complete document *</p> <p>--</p>	13	<p>TECHNICAL FIELDS SEARCHED (Int. Cl.)</p> <p>A 47 L 23/00</p>
A	<p><u>US - A - 3 717 897</u> (H.C. AMOS et al.)</p> <p>----</p>		<p>CATEGORY OF CITED DOCUMENTS</p> <p>X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons</p>
<p>X The present search report has been drawn up for all claims</p>			<p>&: member of the same patent family, corresponding document</p>
Place of search Berlin		Date of completion of the search 29-11-1979	Examiner KLITSCH